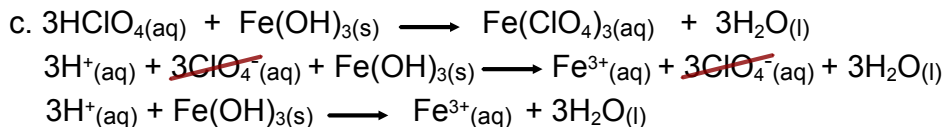
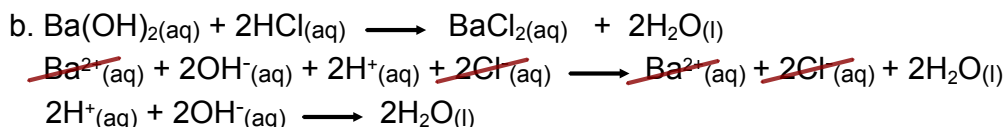
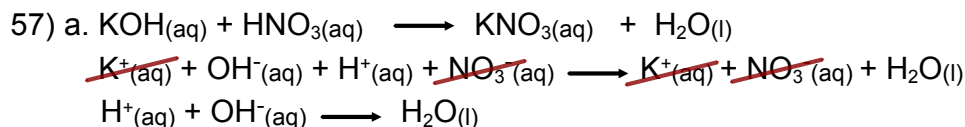
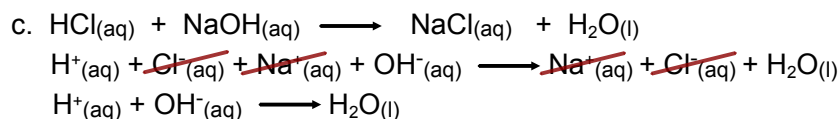
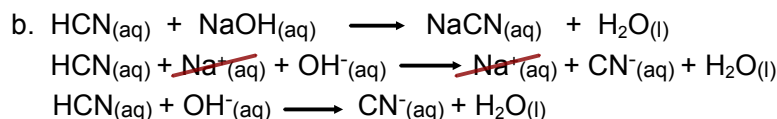
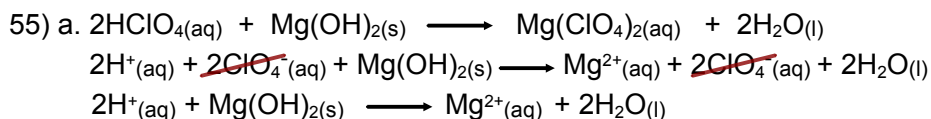


Questions 7, 14, 55 – 59 odd, 63, 65, 91, 106, 107

7) Answer = a. You would need to use twice as much HCl to neutralize the base because it is a monoprotic acid, whereas H₂SO₄ is diprotic.

14) a. The unknown acid must be a diprotic acid such as H₂SO₄, so it took 2 moles of the base to neutralize 1 mol of the acid.

b. The strong base must have been either Ba(OH)₂ or Sr(OH)₂, which produce 2 OH⁻ ions each.

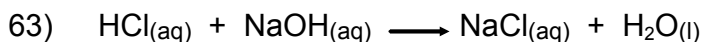


59) $0.05000 \text{ L} \times 0.200 \text{ mol/L} = 0.0100 \text{ mol NaOH}$
 (will react with an equal amount of hydrogen ions)

a. $0.0100 \text{ mol HCl} / 0.100 \text{ M HCl} = \mathbf{0.100\text{L or } 100.\text{mL}}$

b. $0.0100 \text{ mol HNO}_3 / 0.150 \text{ M HNO}_3 = \mathbf{0.0667\text{L or } 66.7 \text{ mL}}$

c. $0.0100 \text{ mol HC}_2\text{H}_3\text{O}_2 / 0.200 \text{ M HC}_2\text{H}_3\text{O}_2 = \mathbf{0.0500\text{L or } 50.0 \text{ mL}}$



$$M_a \cdot V_a = M_b \cdot V_b$$

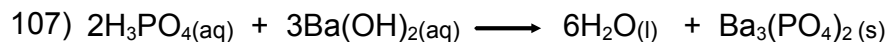
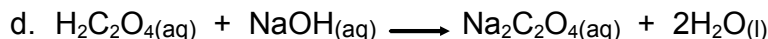
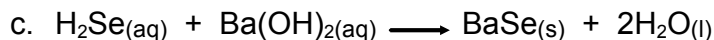
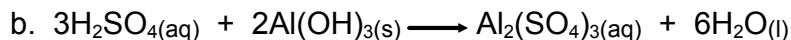
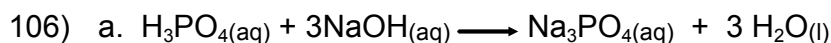
$$25.00\text{mL} \cdot V_a = 24.16 \text{ mL } (0.106\text{M})$$

$$V_a = 0.102\text{M HCl}$$

$$65) \quad \frac{0.02046 \text{ L NaOH} \mid 0.1000 \text{ mol NaOH} \mid 1 \text{ mol KHP} \mid 204.22 \text{ g KHP}}{1 \text{ L NaOH} \mid 1 \text{ mol NaOH} \mid 1 \text{ mol KHP}} = \mathbf{0.4178 \text{ g KHP}}$$

$$91) \quad \frac{0.0250 \text{ L NaOH} \mid 0.500 \text{ mol NaOH} \mid 1 \text{ mol C}_x\text{H}_y\text{O}_z \mid ?? \text{ g C}_x\text{H}_y\text{O}_z}{1 \text{ L NaOH} \mid 1 \text{ mol NaOH} \mid 1 \text{ mol C}_x\text{H}_y\text{O}_z} = 2.20 \text{ g C}_x\text{H}_y\text{O}_z$$

$$?? = \frac{176 \text{ g/mol C}_x\text{H}_y\text{O}_z}{88.06 \text{ g/mol C}_3\text{H}_4\text{O}_3} = 2 \quad \text{molecular formula} = \mathbf{C_6H_8O_6}$$



$$\frac{0.01420 \text{ L H}_3\text{PO}_4 \mid 0.141 \text{ mol H}_3\text{PO}_4 \mid 3 \text{ mol Ba}(\text{OH})_2 \mid 1 \text{ L Ba}(\text{OH})_2}{1 \text{ L H}_3\text{PO}_4 \mid 2 \text{ mol H}_3\text{PO}_4 \mid 0.0521 \text{ mol Ba}(\text{OH})_2}$$

$$= \mathbf{0.0576 \text{ L Ba}(\text{OH})_2}$$

$$\text{or } \mathbf{57.6 \text{ mL}}$$